Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Spectrum Task Force Requests Information on Frequency Bands Identified by NTIA as Potential Broadband Spectrum	)	ET Docket No. 10-123

To: The Spectrum Task Force

COMMENTS OF MOBILE FUTURE

Jonathan Spalter, Chairman
Allison Remsen, Executive Director
MOBILE FUTURE
1325 Pennsylvania Avenue, N.W.
Suite 600
Washington, DC 20004
(202) 756-4154
www.mobilefuture.org

April 22, 2011

TABLE OF CONTENTS

SUMMARY

As President Obama has recognized, "[f]ew technological developments hold as much potential to enhance America's economic competitiveness, create jobs, and improve the quality of our lives as wireless high-speed access to the Internet." The President noted, however, that we cannot "drive the new economy" without "adequate spectrum available to support the forthcoming myriad of wireless devices, networks, and applications." The President, and the Commission, have boldly called for making 500 MHz of new spectrum available for wireless broadband by 2020, almost doubling the amount of spectrum that is currently allocated for commercial mobile services.

NTIA and the Commission are already hard at work to find new spectrum suitable for mobile broadband. As the Spectrum Task Force considers the Commission's next steps "to best promote wireless broadband deployment" in the frequency bands identified by NTIA for potential reallocation, it is important to recognize that not all spectrum is created equal and the wireless ecosystem needs spectrum that can be quickly used for mobile broadband service. Importantly, NTIA's commitment to complete a priority review of the 1755-1850 MHz band by September 2011 is significant. A decision to reallocate the 1755-1780 MHz band promptly will go far to address our Nation's growing demand for mobile broadband spectrum resources.

With the insatiable demand for wireless data on pace to outstrip our current supply, the "clock is ticking" and the consequences of a spectrum shortage are severe. As wireless technology expert Peter Rysavy found in a recent analysis, without sufficient spectrum capacity, networks in cities will become congested, applications will become unreliable and erratic, consumers will get frustrated, and operators will have no choice but to try and limit demand. He further noted that "promising advances, like the innovative mobile applications already available to consumers, may not reach the marketplace, investment levels will drop, and the market will not realize its full potential." In short, there will be a drag on innovation absent new spectrum, and the U.S. will face the real possibility of losing its global leadership position in mobile wireless.

The wireless ecosystem needs the 1755-1780 MHz band and other large contiguous blocks that can be paired below 3 GHz; that are internationally harmonized, creating economies of scale; that are located in proximity to other mobile wireless allocations; and for which equipment is already available or can be made available quickly. Further, we need spectrum that can be made clear of incumbents in short order so it can be put to use quickly for mobile broadband service.

Mobile Future commends the Commission and NTIA for their efforts to identify and make new spectrum available for mobile broadband use. Repurposing spectrum will not be easy, but the consequences of not having enough spectrum capacity to fuel innovation and our economy are severe. Working together, we can bring the right kind of unencumbered spectrum to the marketplace promptly. Our ability to win the future depends on it.

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Spectrum Task Force Requests Information on Frequency Bands Identified by NTIA as Potential Broadband Spectrum	)	ET Docket No. 10-123

To: The Spectrum Task Force

COMMENTS OF MOBILE FUTURE

Over the past year, President Obama, the Administration, and the Federal Communications Commission ("FCC") have repeatedly underscored the importance of wireless broadband to our 21st Century economy and to the social fabric of our Nation. Our policy makers have also made clear that more spectrum suitable for mobile broadband is critical if we are to unleash the full potential of mobile broadband and win the future. Mobile Future[1] fully agrees and provides these comments in response to the Commission's Spectrum Task Force Public Notice regarding Federal Government spectrum bands that the National Telecommunications and Information Administration ("NTIA") has identified or is currently considering for potential reallocation to commercial wireless broadband.[2] These comments

---

[1] Mobile Future is a broad-based coalition of businesses, non-profit organizations and individuals interested in and dedicated to advocating for an environment in which innovations in wireless technology and services are enabled and encouraged. Our mission is to educate the public and key decision makers on innovations in the wireless industry that have transformed the way Americans work and play and to advocate continued investment in wireless technologies.

[2] FCC Public Notice, Spectrum Task Force Requests Information on Frequency Bands Identified by NTIA as Potential Broadband Spectrum, ET Docket No. 10-123, DA 11-444 (rel. Mar. 8, 2011) ("Public Notice").

focus primarily on the 1755-1780 MHz band, which offers many advantages and should be put to use quickly for the benefit of consumers.

I. INTRODUCTION

As President Obama has recognized, "[f]ew technological developments hold as much potential to enhance America's economic competitiveness, create jobs, and improve the quality of our lives as wireless high-speed access to the Internet."[3] The President noted, however, that we cannot "drive the new economy" without "adequate spectrum available to support the forthcoming myriad of wireless devices, networks, and applications."[4] The President, and the Commission, have boldly called for making 500 MHz of new spectrum available for wireless broadband by 2020, almost doubling the amount of spectrum that is currently allocated for commercial mobile services.

NTIA and the Commission are already hard at work to find new spectrum suitable for mobile broadband. NTIA has put forward a ten-year plan and timetable for achieving the President's goal and has identified 115 MHz of "fast-track" spectrum for reallocation from Government to commercial use.[5] The Commission has revisited underutilized spectrum allocations in the Wireless Communications Service and Mobile Satellite Service and is seeking incentive auction authority to create a mechanism for repurposing non-Government spectrum to mobile broadband spectrum.

---

[3] The White House, Presidential Memorandum: Unleashing the Wireless Broadband Revolution (June 28, 2010), http://www.whitehouse.gov/the-press-office/presidential-memorandum-unleashing-wireless-broadband-revolution.

[4] *Id*.

[5] *See* NTIA, *Plan and Timetable to Make Available 500 Megahertz of Spectrum for Wireless Broadband* (Oct. 2010), www.ntia.doc.gov/reports/2010/TenYearPlan_11152010.pdf; Letter from Karl B. Nebbia, Associate Administrator, Office of Spectrum Management, NTIA, to Julius Knapp, Chief, Office of Engineering and Technology, FCC, Jan. 19, 2011, http://www.ntia.doc.gov/filings/2011/NTIA_FCC_Letter_115%20MHz_01192011.pdf.

Not all spectrum is created equal, of course, and the wireless ecosystem needs spectrum that can be quickly deployed for mobile broadband service. Importantly, NTIA's commitment to complete a priority review of the 1755-1850 MHz band by September 2011 is significant.[6] A decision to reallocate the 1755-1780 MHz band promptly will go far to address our nation's growing demand for mobile broadband spectrum resources. And with the release of this Public Notice, the Commission is setting the stage to rapidly repurpose spectrum for mobile broadband use.

II. FINDING MORE SPECTRUM FOR MOBILE BROADBAND IS ESSENTIAL FOR INNOVATION AND ECONOMIC GROWTH.

As Chairman Genachowski recently observed, "we must unleash spectrum and the opportunity of mobile broadband. Spectrum is our invisible infrastructure; it's the oxygen that sustains our mobile communications."[7] We could not agree more.

A. Mobile Broadband is Critical to the Innovation Economy.

Mobile broadband is a powerful platform for commerce and an essential part of our nation's 21st Century economy.[8] Innovators and entrepreneurs continually develop a dizzying array of mobile broadband devices and equipment, applications and services – all supported by our invisible infrastructure, creating billions of dollars in revenue and millions of jobs in the U.S.

---

[6] *See* News Release, NTIA, NTIA Takes Next Step in 500 MHz Wireless Broadband Initiative: Agency to Conduct a Detailed Analysis of the 1755-1850 MHz Band (Feb. 1, 2011), http://www.ntia.doc.gov/press/2011/500mhzstatement_02012011.html.

[7] *See* Remarks of FCC Chairman Julius Genachowski, "The Clock is Ticking," Mobile Future Event, Washington, D.C., Mar. 16, 2011, at 4 ("Chairman's Remarks"), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-305225A1.pdf.

[8] *Id*. at 5.

As the President said, "[i]n America, innovation doesn't just change our lives, it is how we make our living."[9]

In recent years, smartphones have exploded in the marketplace with 69.5 million Americans now having the power of a computer in the palm of their hands.[10] The sales of mobile tablets, virtually non-existent just two years ago, are expected to exceed laptops by 2015, reaching a global market worth $120 billion.[11] Consumers are increasingly buying e-Readers, netbooks, and personal navigation devices, and more recently mobile hotspots. Machine-to-machine ("M2M") devices are also becoming more pervasive in our society, utilizing wireless sensors and infrastructure to transmit data from utility meters, parking meters, traffic lights, and medical equipment, for example.[12] One analyst predicts that there will be 10 billion wirelessly-connected devices worldwide by 2020.[13]

---

[9] *See* Remarks of President Obama, State of the Union Address, United States Capitol, Washington, D.C., Jan. 25, 2011, http://www.whitehouse.gov/the-press-office/2011/01/25/remarks-president-state-union-address.

[10] *See* Press Release, comScore, Inc., *comScore Reports February 2011 U.S. Mobile Subscriber Market Share Press Release*, April 1, 2011, http://www.comscore.com/Press_Events/Press_Releases/2011/4/comScore_Reports_February_2011_U.S._Mobile_Subscriber_Market_Share.

[11] *See Tablets to Surpass Laptop Sales In 2015, One Third of US Consumers Will Own One*, MOBILEMARKETINGWATCH, Jan. 5, 2011, http://www.mobilemarketingwatch.com/tablets-to-surpass-laptop-sales-in-2015-one-third-of-us-consumers-will-own-one-12356/; Stuart Dredge, *Credit Suisse envisages $120bn tablet market by 2015*, MobileEntertainment, Mar. 18, 2011, https://www.mobile-ent.biz/news/read/credit-suisse-envisages-120bn-tablet-market-by-2015.

[12] *See* Jason Hiner, *Smartphones, Tablets, and M2M coming to Verizon 4G Network Press Release*, ZDNet, Oct. 7, 2010, http://www.zdnet.com/blog/btl/smartphones-tablets-and-m2m-coming-to-verizon-4g-network/40148; *see also* Press Release, Verizon Wireless, OnStar Leverages The Verizon Wireless 4G LTE Network To Drive The Future Of In-Vehicle Services (Jan. 5, 2011) (showcasing the future of in-vehicle communications), http://news.vzw.com/news/2011/01/pr2011-01-04.html; News Release, Berg Insight, Berg Insight Releases Global Wireless M2M Subscriber Data for 2010 (Jan. 31, 2011) (reporting that the "worldwide number of mobile network connections used for wireless M2M (machine-to-machine) communication reached 81.4 million at the end of 2010, up 46 percent"), http://www.berginsight.com/News.aspx?m_m=6&s_m=1.

[13] Press Release, Morgan Stanley, Mobile Internet Report (Dec. 2009), http://www.morganstanley.com/institutional/techresearch/mobile_internet_report122009.html.

A mobile applications marketplace has emerged within the past three years with more than 600,000 mobile applications available across multiple platforms.[14] Consumers bought and downloaded mobile applications, generating $2.2 billion in revenues for 2010 with sales expected to reach $38 billion by 2015.[15] Over the next four years, businesses are also expected to spend up to $17 billion to create and manage mobile applications for their products and services as well as for their internal needs.[16]

And, consumers are increasingly using their mobile devices to shop online for retail goods and services with revenues increasing from $396.3 million in 2008 to an impressive $3.4 billion in 2010.[17]

New businesses are also emerging to take advantage of the unique capabilities of mobile broadband, like the ability to provide location-based services. For example, Foursquare, founded in 2007, provides a geo-location based social network that allows users to share their location with friends. The company grew 3,400% last year and is valued at $250 million with 8 million users worldwide.[18] Gowalla, which launched a mobile platform to "check-in" and share photos, highlights and tips in 2009, has grown from 100,000 users just over a year ago to 1 million and

---

[14] Jay Yarow and Kamelia Angelova, *Chart of the Day: Google Is Closing The Gap On Apple's App Store*, BUSINESS INSIDER, Mar. 9, 2011, http://www.businessinsider.com/chart-of-the-day-smartphone-apps-2011-3.

[15] Nick Bilton, *Mobile App Revenue to Reach $38 Billion by 2015, Report Predicts*, N.Y. TIMES, Feb. 28, 2011, http://bits.blogs.nytimes.com/2011/02/28/mobile-app-revenue-to-reach-38-billion-by-2015-report-predicts/.

[16] *Id*.

[17] Press Release, ABI Research, Mobile Commerce Sales Explode in United States: Will Top $3.4 Billion in 2010 (Dec. 17, 2010), http://www.abiresearch.com/press/3578-Mobile+Commerce+Sales+Explode+in+United+States%3A+Will+Top+$3.4+Billion+in+2010.

[18] *See* Mathew Ingram, *Foursquare Is Growing Quickly — But Still Not Mainstream*, GIGAOM (Jan. 24, 2011), http://gigaom.com/2011/01/24/foursquare-is-growing-quickly-but-still-not-mainstream/; Cecilia Kang, *Foursquare Founder Selvadurai Talks About Privacy, Future*, WASH. POST, Apr. 8, 2011, http://www.washingtonpost.com/blogs/post-tech/post/foursquare_founder_selvadurai_talks_about_privacy_future/2011/04/08/AFGYa21C_blog.html?wprss=post-tech. .

expects to have 5-6 million users this summer.[19] LivingSocial, one of the fastest growing companies in the mid-Atlantic region, is now offering location-based bargains to users of its mobile application.[20] Startup companies like these are creating new jobs for American workers.[21]

Then there are the larger economic benefits. About 2.4 million American jobs are directly or indirectly dependent on the U.S. wireless industry, and the wireless sector contributes an estimated $100 billion to the U.S. GDP each year.[22] According to one group, investments in 4G wireless technologies will create 205,000 U.S. jobs, provided spectrum can handle the demand.[23] One analyst estimates the productivity gains from the deployment and use of wireless broadband will generate almost $860 billion in additional GDP by 2016.[24] Of course, mobile broadband also generates immeasurable benefits for society by facilitating access to education, healthcare, and public safety services and helping to improve efficient energy use and transportation.

---

[19] *See* Shayndi Raice, *App Watch: Gowalla Promoting Virtual Passports*, WALL ST. J., Mar. 14, 2011, http://blogs.wsj.com/digits/2011/03/14/app-watch-gowalla-promoting-virtual-passports/; Jon Swartz, *Are Foursquare, Gowalla, Loopt going places?*, USA TODAY, Mar. 14, 2011, http://www.usatoday.com/tech/news/2011-03-11-checkin-services-sxsw_N.htm.

[20] Daiti Hanluain, *LivingSocial Delivers Location-Specific Deals*, APPEDIA, Mar. 8, 2011, http://www.appedia.com/news/2010.html.

[21] For example, LivingSocial, which began in 2008, now has 1,200 employees and is hiring about 6 new employees every day. *See* NVTC, Titans Breakfast featuring Tim O'Shaughnessy (Apr. 6, 2011), http://nvtc2.ve.carpathiahost.net/events/getarchive.php?event=TITANS-35.

[22] *See Ex Parte* Letter from CTIA-The Wireless Association® to the FCC, GN Docket No. 09-51, WT Docket Nos. 08-165, 09-66, attachment at 3 (July 29, 2010); High Tech Spectrum Coalition, Economic Benefits of Wireless Broadband, www.hightechspectrumcoalition.org/WirelessEconomy_One-pager.pdf.

[23] *See* High Tech Spectrum Coalition, Economic Benefits of Wireless Broadband, www.hightechspectrumcoalition.org/WirelessEconomy_One-pager.pdf.

[24] Roger Entner, THE INCREASINGLY IMPORTANT IMPACT OF WIRELESS BROADBAND TECHNOLOGY AND SERVICES ON THE U.S. ECONOMY, at 4 (2008), http://files.ctia.org/pdf/Final_OvumEconomicImpact_Report_5_21_08.pdf.

B. We Can Only Win the Future if We Have Sufficient Spectrum Capacity to Compete and Innovate.

With the insatiable demand for wireless data on pace to outstrip our current supply, the "clock is ticking" and the consequences of a spectrum shortage are severe.[25] As wireless technology expert Peter Rysavy found in a recent analysis, without sufficient spectrum capacity, networks in cities will become congested, applications will become unreliable and erratic, consumers will get frustrated, and operators will have no choice but to try and limit demand.[26] He noted further, "[a]s a result, promising advances, like the innovative mobile applications already available to consumers, may not reach the marketplace, investment levels will drop, and the market will not realize its full potential."[27] In short, there will be a drag on innovation, and the U.S. will face the real possibility of losing its position as a global technology leader.

The window to act is relatively short. The Commission estimates a spectrum deficit of 300 MHz by 2014, and it has typically taken between 6-13 years for new spectrum to reach the marketplace.[28]

Meanwhile, other countries are already moving ahead quickly to introduce new spectrum into the mobile broadband marketplace. For example, the United Kingdom plans to start accepting applications for the auction of 250 MHz of spectrum in the 800 MHz and 2.6 GHz

---

[25] Chairman's Remarks at 5.

[26] PETER RYSAVY, THE SPECTRUM IMPERATIVE: MOBILE BROADBAND SPECTRUM AND ITS IMPACTS FOR U.S. CONSUMERS AND THE ECONOMY, at 21 (rel. Mar. 16, 2011).

[27] *Id*.

[28] FCC STAFF TECHNICAL PAPER, MOBILE BROADBAND: THE BENEFITS OF ADDITIONAL SPECTRUM, at 2, 26 (rel. Oct. 21, 2010), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-302324A1.pdf; NBP at 79.

bands by the 1st quarter of 2012.[29] For the U.S. to remain competitive and retain its global leadership position, we must keep pace.

III. FINDING THE RIGHT KIND OF SPECTRUM FOR MOBILE BROADBAND IS A NATIONAL IMPERATIVE.

As Chairman Genachowski said, "[t]he opportunities surrounding mobile are real, but so are the challenges."[30] In many cases, the low hanging fruit of available spectrum has already been converted for flexible use, and repurposing spectrum suitable for mobile broadband will require substantial effort. To this end, the Commission's Spectrum Task Force has asked for input on the steps the Commission "can take to best promote wireless broadband deployment in the 1695-1710 MHz and 3550-3650 MHz bands" and other bands, including the 1755-1850 MHz band.[31] The answer is clear. The Commission should work with NTIA to reallocate the 1755-1780 MHz band for commercial mobile broadband use, free and clear of incumbents.

A. Review of Government Spectrum Should Focus Primarily on the 1755-1780 MHz Band.

The right kind of spectrum is needed for continued growth and innovation in mobile broadband. In particular, policy makers should identify:

- Spectrum in large contiguous blocks below 3 GHz;
- Spectrum that is internationally harmonized, creating economies of scale;
- Spectrum that is located in proximity to other mobile wireless allocations; and
- Spectrum for which equipment is already available, or can be made available in short order.

---

[29] Ofcom, *Consultation on Assessment of Future Mobile Competition and Proposals for the Award of 800 MHz and 2.6 GHz Spectrum and Related Issues*, at 9 (rel. Mar. 22, 2011), http://stakeholders.ofcom.org.uk/binaries/consultations/combined-award/summary/combined-award.pdf.

[30] Chairman's Remarks at 5.

[31] *See* Public Notice at 1.

The 1755-1780 MHz band fits these criteria. This large continuous block of spectrum is situated below 3 GHz, which is critical for mobility. It is harmonized internationally, allowing industry to leverage global economies of scale and opening up international markets for the sale of innovative devices and equipment developed by American companies for this spectrum. The 1755-1780 MHz band is also well-suited for pairing with the unassigned spectrum in the AWS-3 band. Further, this spectrum is located next to the AWS-1 bands, producing significant efficiencies for deployment. For example, base stations already designed for the AWS-1 band can easily be modified to use the 1755-1780 MHz band, meaning that operators can quickly put this spectrum to use for the benefit of consumers.[32]

There is an overwhelming consensus in the wireless industry that the 1755-1780 MHz band is the best spectrum in the 1.7 GHz range to reallocate to broadband use. NTIA and the Commission should therefore make every effort to make this spectrum available for mobile broadband as soon as possible.

B. Other Identified Government Spectrum Bands May Potentially Be Viable.

As for the other spectrum bands identified by NTIA for potential wireless broadband use, they may one day help to fuel the mobile broadband economy but they are not as ideal as the 1755-1780 MHz band. For example, the 1695-1710 MHz frequencies could potentially be paired with the AWS-3 band. However, the spectrum is not internationally harmonized, so there would not be the same global economies of scale or potential for international exports as with the 1755-1780 MHz band. In addition, because the duplex spacing for a pairing with the AWS-3 band would be wider than with the 1755-1780 MHz band, new receivers would need to be

---

[32] *See* Comments of CTIA—The Wireless Association, ET Docket No. 10-123, at 5 (filed June 28, 2010).

developed.[33] A recent study found that because of these differences, there would be a substantial decrease in the economic value of the AWS-3 band if it were paired with the 1690-1710 MHz band as opposed to the 1755-1780 MHz band, *i.e.*, an estimated decrease of $4.7 billion in auction revenues.[34]

The 100 MHz of spectrum identified in the 3550-3650 MHz frequency band may not be as viable for mobile broadband due to the fact that it is above 3 GHz. In addition, the exclusion zones proposed by NTIA are highly restrictive – prohibiting non-Federal users from operating within as much as 570 km (354 miles) of the U.S. coastline.[35] Many of America's major metropolitan areas would fall within an exclusion zone, *e.g.*, New York City, Washington, DC, Houston, TX, and Los Angeles, CA. Such exclusion zones would create a disincentive for the development of equipment and devices for this spectrum.

The 4200-4220 MHz and 4380-4400 MHz bands identified by NTIA are also well above 3 GHz. Moreover, as noted by NTIA, use of this band for broadband service would require changes to the international table of frequency allocations, and there is no certainty as to when or whether such changes can be accomplished.[36] Nonetheless, in seeking a change for the World Radiocommunication Conference 2016 agenda, the U.S. should strive to add a Fixed and Mobile allocation across all three regions to foster the international harmonization of spectrum and create global economies of scale.

---

[33] *See* COLEMAN BAZELON, THE ECONOMIC BASIS OF SPECTRUM VALUE: PAIRING AWS-3 WITH THE 1755 MHZ BAND IS MORE VALUABLE THAN PAIRING IT WITH FREQUENCIES FROM THE 1690 MHZ BAND, at 12 (Apr. 11, 2011), http://www.brattle.com/Experts/ExpertDetail.asp?ExpertID=181&page=1.

[34] *Id*. at 1. For the purposes of this study, an additional 5 MHz of spectrum was added to the 1695-1710 MHz frequency bands identified by NTIA to provide a symmetrical pairing with the 20 MHz of spectrum in the AWS-3 band. *Id*. at 1 n.1.

[35] *See* Public Notice at 3.

[36] Public Notice at 4.

C. Spectrum is Needed Clear of Incumbent Operators.

The Government and industry should work closely together to provide, as soon as possible, spectrum suitable for mobile broadband that is clear of incumbents – in particular, the 1755-1780 MHz band. To that end, Federal Government agencies must have the resources they need to relocate and still fulfill their mission critical operations. Mobile Future supports changes to the Commercial Spectrum Enhancement Act to improve on that process.

Changes could include making funds available to Government users in advance of an auction to assist with the development of transition plans. In addition, policy makers could create incentives for the return of inefficiently-used spectrum by Federal users as called for in legislation currently pending before Congress.[37]

Relocation is not insurmountable, even in the 1755-1780 MHz band where there are extensive Federal Government operations. However, to successfully relocate incumbents, a more open dialogue is needed between the Federal Government and the wireless industry on the transition issues facing incumbent operators. With more transparency, the industry can use its expertise to help the Government to devise a solution that is amenable to all parties involved.

IV. CONCLUSION

Mobile Future commends the Commission and NTIA for their efforts to identify and make new spectrum available for mobile broadband use. Repurposing spectrum will not be easy, but the consequences of not having enough spectrum capacity to fuel innovation and our

---

[37] *See, e.g.*, Spectrum Relocation Improvement Act of 2011, S.522 (introduced Mar. 9, 2011) (allowing for the funding of pre-relocation planning activities); Reforming Airwaves by Developing Incentives and Opportunistic Sharing (RADIOS) Act, S.455 (introduced Mar. 2, 2011) (providing incentives for the efficient use of spectrum by the Federal government).

economy are severe. Working together, we can bring the right kind of unencumbered spectrum to the marketplace promptly. Our ability to win the future depends on it.

Respectfully submitted,

By: __/s/ Jonathan Spalter_____
Jonathan Spalter, Chairman
Allison Remsen, Executive Director
MOBILE FUTURE
1325 Pennsylvania Avenue, N.W.
Suite 600
Washington, DC 20004
(202) 756-4154
www.mobilefuture.org

April 22, 2011